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BLOCKCHAIN-BASED DISINTERMEDIATION AND ITS EFFECT IN B2C RELATIONSHIP

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ABSTRACT OF
BACHELOR'S THESIS

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Objectives

To establish a comprehensive understanding of blockchain-based disintermediation and its effect on B2C relationships, the first critical thing to identify is the promising features of blockchain. Then, the concept and usage of disintermediation are investigated. Afterward, the concept of blockchain-based disintermediation and its benefit in B2C relationship building are explored. Finally, this thesis aims to recognize the challenges of using blockchain to enhance B2C relationships in the current phase of blockchain development.

Summary

Digitalization and the move toward mass customization have vitalized customer data and its impacts in the value chain, which encourage the growth of data intermediaries. However, the dominance of these intermediaries in the processing of data results in data vulnerability, prevents the value maximization of customer data, and threatens B2C relationships. With its technical properties, namely decentralization, security, transparency, and immutability, blockchain can be an optimal solution for this data dilemma. Through blockchain-based solutions, disintermediation, or removal of unnecessary data intermediaries, is encouraged, which can improve the processing of customer data and strengthen B2C relationships.

Conclusions

Blockchain-encouraged disintermediation can reduce cost, complexity, and uncertainty associated with data intermediaries' dominance while also redistributing control, adding trust, and improving B2C relationships. Customers might have complete control in a secured data management process, in which they can monetize their data. Simultaneously, B2C firms can directly communicate to their customers, access more accurate customer data, and encourage customers to co-create value.

KEY WORD: *Blockchain, Disintermediation, B2C relationship, Customer-brand relationship*

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1. INTRODUCTION

Since the mid-90s, customer relationships have been a vital part of many business models' success, especially the ones that deal directly with customers (Sheth & Parvatiyar, 1995). However, recent research has shown how customer-brand relationships are enduring an extremely vulnerable era under the dominance and rapid expansion of multi-layers e-intermediaries (Epstein, 2017; Mitselmakher, 2019). For these reasons, this research aimed to provide a feasible solution to this alarming issue by using a noble technology named blockchain and its renowned technical property: disintermediation. As the first chapter of the thesis, this chapter prepares for the research paper by explaining the background of the study, the research question, the research objectives, and its significance for both academic and business implications.

1.1. Background of Study

Conceptualized in 2008 by Nakamoto, Bitcoin was the first major blockchain innovation (Gupta, 2017; Antoniadis et al., 2019). As the world's first decentralized peer-to-peer payment system and the world's first cryptocurrency, Bitcoin immediately gains considerable publicity and becomes one of the most promising, high-risk-high-return markets, sitting at an all-time-high 1 trillion US dollar market cap by March 2021 (Statista, 2021). Indeed, the birth of Bitcoin not only recognizes the potential of cryptocurrency and crypto-payment but also foster the realization of blockchain, i.e., the acknowledgment that the blockchain technology can be customized for specific solution designs and used for other applications other than cryptocurrency and crypto-payment (Gupta, 2017; Mitselmakher, 2019). The smart contract, for example, is a famous application of blockchain, in which agreements between buyers and sellers are written directly on blockchain and will be automatically executed when predetermined conditions are met (Pilkington, 2016; Boukis, 2019).

Since its realization, blockchain is often referred to as a disruptive innovation. With valuable technical properties such as decentralization, immutability, and transparency, blockchain is a potential solution for many alarming issues of the

current business world, especially the ones relating to trust issues, data privacy, and data authenticity (Antoniadis et al., 2019). Indeed, the digital customer-brand relationship is an area where blockchain can bring significant alterations. The technological advances in the past decades have enabled the remarkable growth of e-commerce businesses and impactful digital media platforms. Firms can better understand their customers and develop more personalized customer profiles thanks to data intermediaries such as media powerhouses, information brokers, and advertising platforms (Rejeb et al., 2020). Such changes ultimately result in significant improvements in product and service customization. However, from many perspectives, the dominance and rapid growth of intermediaries are not ideal for businesses and firms. For firms, it precludes them from recognizing the potential need and wants of their customer, which limits them from generating new prospects and target offerings. For customers, it discourages a system of more customer-centered support and dynamic personalization.

Indeed, blockchain's characteristics make this technology one of the most suitable solutions for improving the connection between customer and brand in the digital world. However, the number of available research projects that focus on this domain is considerably limited (Antoniadis et al., 2019; Rejeb et al., 2020). The majority of the research on blockchain applications mainly focuses on finance, supply chain management, and healthcare (ibid). Thus, this research provides the needed insights and reduces the knowledge gap of this impactful topic.

1.2. Research Problem

As argued by many scholars, the dominance and rapid expansion of multi-layers data intermediaries have significantly damaged B2C relationships, causing an extremely vulnerable relationship state (Epstein, 2017; Mitselmakher, 2019). Although customers value the effort of a brand to customize products based on customer reference, the complex, unclear, and sometimes insecure data management process can lead to an acute sense of data vulnerability and weaken customers' trust in firms (Martin et al., 2017).

With its technological characteristics, blockchain can offer a solution to omit intermediaries, ensure that consumers can interact and engage directly with the brand, and foster stronger B2C relationships. For those reasons, the author is interested in further investigating how blockchain can foster online B2C relationships with its impacts on disintermediation. Therefore, the overall research problem is blockchain and its attribution to online B2C relationships through its impacts on disintermediation.

1.3. Research Questions

The two research questions proposed by the author for this thesis are:

- How can blockchain-enabled disintermediation impact B2C relationship building?
- What are the real-life cases that utilize this possibility of blockchain?

1.4. Research Objectives

- To identify the critical promising features of blockchain
- To investigate the existing concept and usage of disintermediation
- To explore the contribution of blockchain to disintermediation
- To explore the benefits of blockchain-based disintermediation in B2C relationship building
- To recognize the challenges of using blockchain as a tool for B2C relationship building regarding the current phase of blockchain

1.5. Structure of the Study

The first section of this thesis is the introduction. Afterward, the study will continue with a review of existing literature, description and explanation of methodology,

analysis of research findings, discussion of the research process. In the last section, the conclusion will summarize all of the mentioned issues.

2. LITERATURE REVIEW

This literature review is established to identify the necessary knowledge to explain the key issues, obtain a comprehensive understanding of the topic, and highlight knowledge gaps in the field (Rocco & Plakhotnik 2009). Ultimately, the final goal of this literature review is to justify the reasons for the stated research questions and develop a conceptual model to reflect the objectives of the research paper.

The literature review is divided into five sections. In the first part, the definition, mechanism, types, advantages, and disadvantages of blockchain are discussed. The second part reflects the current state of B2C relationships in the online context, with particular attention to its alarming issues. The third part assesses disintermediation, its effects on the economy, and existing expert opinions on this topic. The fourth part is the conceptual framework, which presents an overview of the thesis and the relationship between the research questions. In the last part, there is a conclusion to summarise the entire literature review section.

2.1. Blockchain

In 2008, Nakamoto published a proposal for blockchain, a technology that can enable a disruptive peer-to-peer digital payment system and pave the way for the establishment of the first cryptocurrency, Bitcoin. Due to several features, including decentralization, data privacy, immutability, transparency, resilience, and pseudonymity, blockchain has provided significant impacts to the financial sector (Tapscott & Tapscott, 2016). Indeed, novel concepts, such as smart contracts, have motivated the continuous investigation for other applications of blockchain in other business fields (Wörner et al., 2016; Morkunas, 2019). With the same interest, this thesis will reduce the knowledge gap by addressing the use of blockchain in online

B2C relationship building. Thus, it is critical to understand the core values of blockchain and the foundation of its abilities.

2.1.1. The definition of Blockchain

The name blockchain symbolizes the ability of the system: connecting blocks of information to create continuously growing chains. Each block in the network is a data storage unit, which records and updates a group of concurrent transactions (OECD, 2018). The subject of transactions can be anything from digital currency, through data to asset ownership (Tapscott & Tapscott, 2016). Blockchain time-stamps and chronologically links these blocks of data through a hash-based consensus mechanism, which requires mutual agreements between all users or nodes in the chain (Nakamoto, 2008; Pilkington, 2016; OCD 2018). For this reason, the ledger is immutable unless the proof of the consensus mechanism is reconstructed. Additionally, blockchain is a peer-to-peer system, meaning that information can be shared between a large number of users in the network without the need for any centralized third parties (Hawlitschek et al., 2018). Thus, as argued by Puthal et al. (2018), blockchain enables a digital, decentralized, and distributed database while still offering integrity, immutability, and irreversibility.

2.1.2. The operating principles

In figure 1, 6 steps for accepting a transaction into a blockchain-enabled data system are presented. As a transaction request is generated, it would be transmitted to the rest of the network nodes. After other network participants ratify the user and transaction information, the data will be stored as a new block. Subsequently, this block will be attached to the existing ledgers, and the process is complete with the chain gaining a new block.

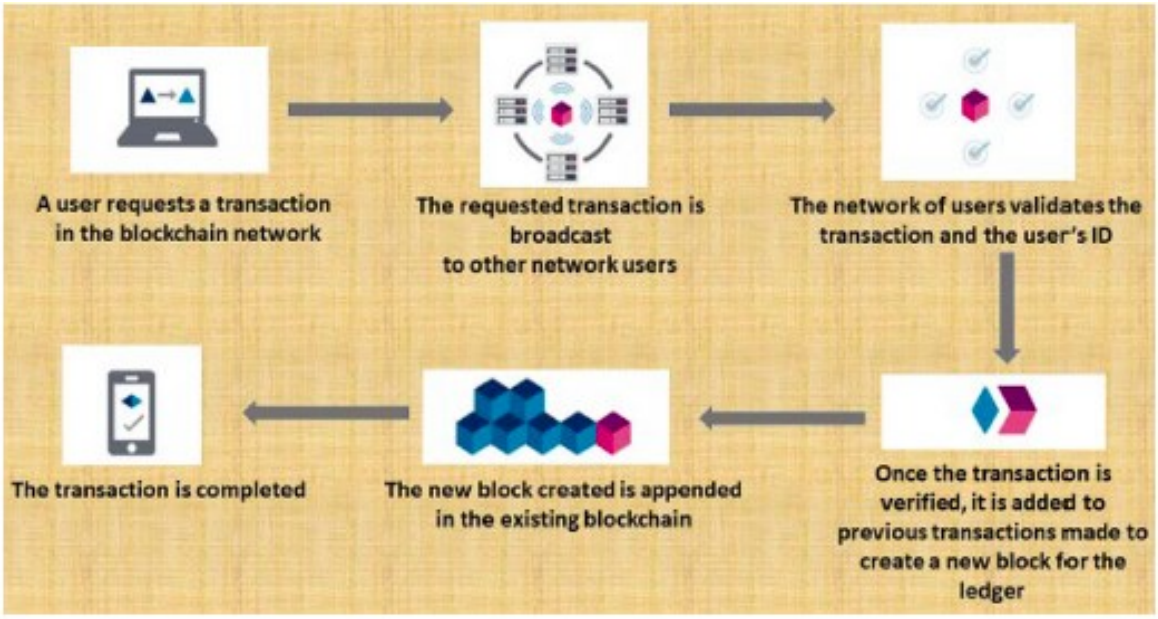

Figure 1: Transaction steps in the blockchain network (Boukis, 2019)

In addition to the 6 mentioned steps, Morkunas et al. (2019) argue that before the broadcast of a transaction, the requester needs to add his cryptographic signature to confirm the authenticity and integrity of the transaction.

To facilitate the transaction steps, blockchain implements a set of distinct underlying principles, including cryptographic hash function, digital signature, and consensus algorithm, such as Proof-of-Work (PoW) or Proof-of-Stake (PoS) (Pilkington, 2016; Puthal et al., 2018; OECD, 2018).

2.1.2.1. Cryptographic hash function

Cryptographic hashing is a mathematical algorithm that can create unique and almost inconvertible output for every entered input (Pilkington, 2016). Through this function, information of a transaction will be converted into "a set of letters and numbers that is distinct to that transaction" (OECD 2018: 7). The hash for each specific input will remain unchanged regardless of the times of execution. However, as long as there are modifications in the input, even as subtle as upper or lower case, they will be followed by considerable adjustments in the output (ibid). Moreover, the fact that "each block header contains the hash of the previous block header" makes it impossible to change the ledger without being detected (Rejebt et al., 2020). Therefore, each hash is collision-resistant and is extremely hard to be

reverted (Pilkington, 2016), which results in the tamper-proof and immutability of blockchain.

2.1.2.2. Digital signature

The recurrent act of hashing supports the establishment of the user's digital signature, which is a crucial part of transaction authentication. As a new user makes an initial transaction request in a blockchain-based network, two unique keys will be simultaneously generated: a private key for authorization and a public key for verification. The private key can only be recognized by the owner and, for that reason, act as the user's digital ID (Nakamoto, 2008). Before any transaction is broadcasted to the system, it is signed by the user using the private key. The ownership of this signature will then be anonymously verified through the public key of the same owner. Specifically, the two keys are inconvertible from each other. In other words, it is impossible to form the private key using the public key (Pilkington, 2016). For all of the mentioned reasons, users can be pseudonymous and identifiable at the same time.

2.1.2.3. Consensus mechanism

Another critical aspect of blockchain is consensus algorithms, as this technology was developed based on the concept of decentralization. Since there is no central party in charge of data security and accountability to prevent possible data breaches, blockchain requires a mutual agreement among its nodes for every decision made (Pilkington, 2016; Tapscott & Tapscott, 2016; OECD, 2018). At the moment, there are up to 12 consensus protocols available or blockchain-based ledger; However, PoW and PoS remain the two most widely used models.

In the case of Bitcoin, the most well-known cryptocurrency that runs on blockchain, the PoW is implemented. This consensus model requires its users to solve a cryptographic puzzle by scanning for an input from which an output beginning with a number of zero bits can be produced using the hash function (Nakatomo, 2008). All the nodes in the network will compete with each other in this solving process, and the first one to solve the problem will verify the new transaction block and be rewarded with tokens (OECD, 2018; Puthal et al.,2018). Since the process of creating PoW shares some similarities with the act of mining, blockchain users are

sometimes called miners. Besides motivating miners with transaction incentives, PoW also acts as a representative in majority decision-making (Nakatomo, 2008). The transactions with the earliest time-stamp would be valid through the most significant effort of PoW invested. Therefore, the longest chain will act as a verification element in case of grievance (Nakamoto, 2008; Wörner et al., 2016; Zamani & Giaglis, 2018). In other words, to modify recorded transactions, one would need to rewrite every PoW on the chains and overtake the normal, 'honest' chains, which will be more and more impossible as the blocks continue to expand (Nakatomo 2008). Indeed, a blockchain-based system can only be altered in case of the 51% attack, in which more than 50% of the nodes are controlled by the hacker (ibid). As the attacker gathers enough power to take control of the majority of the nodes, he would be the fastest to create new PoWs, which may give him a chain to rewrite all of the needed PoW and overtake the system.

While Bitcoin and some highest-profile blockchains utilize PoW as a consensus model, many other cryptocurrency networks choose to work with PoS. Indeed, many believe that PoS is a better alternative compared to PoW (Pilkington 2016). In its 2.0 version, Ethereum 2.0, the second-largest cryptocurrency system, plans to switch from PoW to PoS, hoping to achieve better data security with significantly less resource consumption and scalability issues. As the name may signify, the main difference between PoS and PoW lies in the method of block division. While PoW splits blocks based on work, which is the mining and hashing power of miners, PoS appraises the stakes, i.e., the amount of deposit made by the validators (Pilkington, 2016). As a user deposits a certain number of coins into the network, he will have a chance to become the validator of the next coming blocks and receive the block reward and the extra validation fee. The probability of being selected as validators would increase linearly according to the size of the users' stakes. However, in the case of fraudulent transactions, these users will lose part of their stakes. Such punishment, which is usually referred to as slashing, financially motivates the validators to perform the work correctly and strengthens the authentication of the system as long as the stake deduction is larger than the reward. Although it is a slight change in the validation method, PoS in place of PoW means that some of the major blockchain problems, such as transaction capacity, energy consumption, and the 51% attack, will be significantly reduced.

The diversity of available consensus protocols reflects the evolving nature of blockchain as a distributed ledger technology (DLT). Although blockchain is still an emerging technology, it can be argued that a blockchain-based network, regardless of the choice of which consensus model to adopt, can offer great utilities and challenge some of the existing business models (Tapscott & Tapscott, 2017; Morkunas, 2019).

2.1.3. Advantages of Blockchain

According to Nakamoto (2008), blockchain is proposed as an effective resolution for the double-spending problem, a phenomenon when a digital currency is spent twice (Hawlitschek et al., 2018; Boukis, 2019). This problem is present due to the indistinct nature of digital records of such transactions (ibid). With its cryptographic hash function, blockchain can solve this similarity issue by creating a unique output for every received input.

Indeed, blockchain can offer more than just distinctive encoded output. Lee and Pilkington (2017) stated that blockchain is a DLT with two main properties: immutability and transparency. These characteristics are possible due to a combination of blockchain underlying features, which consist of cryptographic hashing, digital signature, and consensus protocol. However, the primary source of blockchain immutability and tamper-proof is provided through its hashing function. Through cryptographic hashing, every transaction recorded in a blockchain-based system will be permanently timestamped (Tapscott & Tapscott, 2017). The complex nature of the hashing algorithm prevents the recreation of the original information from the hashed output, which means that the ledger cannot be modified after being added (Chauhan et al., 2018). Consequently, the detailed information of any transactions made by any involving parties is collision-resistant, immutability, and traceable by nature.

The transparency of blockchain, on the other hand, first comes from the fact that each transaction is only made after being verified by the participating nodes. Thus, under normal circumstances, adjustments cannot be made without any approval from the users (Wörner et al., 2016). In other words, blockchain's data integrity can

only be affected if the attacker can get access to over half of the nodes and surpass the coding speed of other honest nodes. Besides the mutual knowledge established by consensus models such as PoW or PoS, blockchain requires every user to access two different keys to confirm a valid transaction digitally. Thus, each participating party can always be sure that the other participating parties are authorized through the private key and verified through the public key. As a result, the use of digital signatures also significantly contributes to the transparency of blockchain.

Another essential feature of blockchain is decentralization, which, according to several researchers, is considered to be the most unique and fundamental feature of blockchain (Plant, 2017; Seebacher & Schüritz, 2017; Rejeb et al., 2020). Blockchain relies on the mutual agreement of its users for data confirmation and authentication. For this reason, each user is aware of any successful changes and holds his local copies of such adjustments, which would be added to his ledger accordingly (Plant, 2017). In order words, the entire transaction background made by any involving parties can be accessed and verified by any involving parties (Risius & Spohrer, 2017; Boukis, 2019), and one needs to reconstruct all these existing PoWs to modify any transaction. Such distributed decision-making systems mean that data transactions are constructed by everyone, but they belong to no one. As network users give up control of their data, all transactions in blockchain-enabled networks can achieve that desired level of transparency (Plant, 2017; Boukis, 2019). Besides, blockchain reliance on mutual agreement instead of central control nodes also obliterates a single-point failure, which contributes to blockchain resilience as a data system (Lee & Pilkington 2017). As explained by the OECD (2018), when compared with traditional databases in which data are stored and maintained centrally, blockchain has significantly lowered risks of data loss and illegal data control due to its decentralization.

Ultimately, blockchain decentralization means that the technology can offer security and transparency without the need for a central authority. Thus, blockchain can foster disintermediation or remove middle layers that reduce efficiency, limit ability, and increase cost, which is one of the foremost benefits of blockchain (Morkunas, 2019; Rejeb et al., 2020). As opposed to indirect communication, direct peer-to-peer communication should result in an enhancement in transparency and a significant

increase in transaction efficiency (Hawlitschek et al., 2018; Boukis, 2019). Additionally, as blockchain users communicate and exchange data on a peer-to-peer basis, more value can be created for the involved parties due to value co-creation. As explained by Lee & Pilkington (2017: 22), blockchain-based disintermediation encourages the concept of ‘prosumer’, or ‘the active cooperation between producer and consumer’, which leads to more customer-centric business cycles and better economic returns.

2.1.4. Critical Issues for Blockchain Implication

Although consensus mechanisms provide blockchain with various properties such as integrity and decentralization, this critical protocol leads to numerous visible issues that should be considered before the adoption of blockchain. These concerns are usually referred to as the consensus dilemma, which consists of the scalability problem, the sustainability concern, and the risk of 51% attack.

Initially, each transaction request must be broadcasted and verified by the other network nodes before being added to the blockchain-based data system (Chauhan et al., 2018). Afterward, once a transaction is confirmed, a local copy needs to be sent and automatically updated to the ledger of the participating nodes (Plant, 2017). Such working principles, however, require a substantial amount of time and resources and lead to the so-called blockchain scalability problem. Thus, as the network significantly increases in the number of users and transactions, many scalability issues such as increased chain size, limited block size, and low transactions per second (TPS) can affect the practicality of the network, especially in time-sensitive situations (Kim et al., 2018; Puthal et al., 2018; Zhou et al., 2020). First of all, when a chain manages to expand to a large enough number of nodes, storing all transactions of the participating nodes in that one chain would make the capacity too large to be maintained (ibid). Second of all, each block in the blockchain network can only contain a limited number of transactions. Thus, a significant increase in the number of transactions would lengthen the process of transaction execution (Chauhan et al., 2018; Kim et al., 2018). In 2017, Bitcoin needed to process at least 130,000 daily transactions (Chauhan et al., 2018). Such a large number of transactions created a stressful verification challenge and drove the

transaction waiting time to almost half an hour (ibid), which significantly reduced blockchain's efficiency. For example, the highest reported transaction throughput of Bitcoin is only 7 TPS, which is extremely limited compared to Visa's 4000 TPS (Zhou et al., 2020). Under such situations, many users may choose to pay considerably high extra fees to speed up the transactions. Hence, as long as the mentioned scalability issues remain unsolved, blockchain-based systems might still be limited in performance in large-scale processing.

To increase the practicality of blockchain adoption, researchers have been proposing different resolutions to the scalability problems. Zhou et al. (2020) categorize around ten available core methodologies into two layers according to the operational structure of blockchain. The focal point of Layer1 is the on-chain aspects of blockchain, which refer to the structure of the blocks, consensus algorithm, and the structure of the main chain (ibid). In general, on-chain solutions target the adjustments of elements only within a blockchain (Kim et al., 2018). Among the available on-chain solutions, reconstruction of better alternative consensus models is considered to be the most sufficient by scholars. For example, the PoS, compared to the original Bitcoin PoW, has significantly higher scalability due to the nature of its verification process. In PoW-enabled blockchain, miners need to directly compete in solving the algorithm to get the validator right before a transaction can be processed. However, in the case of PoS, validators can be selected to authenticate the transaction without any waiting time, which would boost the network's scalability.

Besides the alteration of the consensus mechanism, blockchain scalability can be solved through sharding. This technique divides the whole network into several smaller networks called shards, each of which processes a limited number of nodes and has its transaction ledger. Additionally, sharding allows transactions on different shards to be processed in parallel, which reduces the burden of the mainchain (Chauhan et al., 2018; Kim et al., 2018; Zhou et al., 2020). Hence, the concurrency of the process would be significantly improved, which leads to the increased throughput of the entire blockchain system (ibid). Ethereum, for example, expects to launch 64 shards in its Ethereum 2.0, and the entire Ethereum 1.0 chain will become one of these 64 shards in step 1.5 of their process. Together with PoS, the adoption of sharding will bring Ethereum 2.0 an extreme power to tackle the long-standing problem of blockchain scalability. However, it should be noted that sharding can lead

to the chances of the 1% attack, i.e., when the attackers can control the entire single shard. Under such circumstances, blockchain will lose its data integrity.

Layer2, as opposed to Layer1, concentrates on the off-chain aspects, meaning that these solutions improve blockchain scalability by process some transactions and complex tasks through an off-chain channel and preserve the state of the mainchain (Kim et al., 2018; Zhou et al., 2020). Two well-known representatives of the off-chain category are the payment channel of Bitcoin's Lightning network and the side chain of Plasma of Ethereum. Despite the different solution foundations, both Lightning network and Plasma utilize the different secondary blockchain layers to process the small details of transactions and only record the outcome of those secondary chains onto the main chain. The mainchain, therefore, will be less likely to be overloaded with transactions, and the overall system scalability can be considerably improved.

Although the existing solutions somewhat improve the scalability, it should be noticed that most of these solutions sacrifice a fundamental property of blockchain, i.e., decentralization, and also bring new security issues. In summary, with both advantages and limitations, those solutions are striving to achieve decentralization, security, and scalability simultaneously.

2.2. B2C relationship

2.2.1. The history of B2C

B2C is a terminology that refers to a type of transaction in which products and services are traded directly between business and customers. Customers, therefore, are the direct end-users in this business model. Traditionally, the concept of B2C refers to any direct selling to the customers, from individuals shopping at brand stores to families eating out in restaurants. However, along with the creation of the Internet and the rapid growth of e-commerce in the current world, the term B2C is often associated with online sales activities. Hence, under the scope of this thesis, the term B2C has an equal meaning to business-to-customer activities that happen in the online context. When comparing brick-and-mortar or traditional B2C and e-commerce B2C, the full terms will be utilized to prevent any possible confusion and misunderstanding.

Although it is not directly invented by Michael Aldrich, the concept of B2C is greatly credited to this British inventor. In 1979, Aldrich came up with an original concept named teleshopping, which later became the foundation for modern e-commerce (Aldrich, 2011). The system introduced by Aldrich connected a modified domestic TV to a real-time processing computer via a domestic telephone line (ibid). Such a structure made it possible for a closed information system to be opened and shared securely by outside parties. Businesses can directly connect to their consumers for the first time and in a somewhat effective manner. However, due to technological limitations and concerns regarding data security, the concept of B2C and e-commerce did not become economically viable until the early 1990s.

In 1991, Tim Berners-Lee and Robert Caillliau successfully launched the world's first web browser, the World Wide Web. Three years later, the Secure Socket Layer, a security protocol constructed by Netscape, was introduced to the world as a solution to the critical security issue. The ground-breaking technology paved the way for e-commerce, and B2C business models became more feasible than ever. Thus, starting from the late mid-1990s, the world witnessed the continuous establishments of several B2C focused-firms, some of which endured the test of time and came to be the major players in the current B2C world, such as Amazon (1995), Paypal (1998), Alibaba (1999), and Google (2000). Since then, B2C has been thriving to become one of the most popular and profitable business models. In 2019, the sales of the U.S. Amazon alone were estimated to worth over USD 222.6 billion. A report conducted by Grand View Research (2020) estimated that in 2019, the global B2C market reached USD 3.35 trillion and is expected to reach USD 6.2 trillion in 2027.

2.2.2. The B2C relationship and Data Privacy challenge

The tremendous expansion of B2C occurs for a set of logical reasons. From a consumer perspective, it is the convenience and personalization that distinguish online B2C from the other ways of purchasing an item, such as shopping at brick-and-mortar stores. Customers enjoy the fact that they can shop from their location, at their preferable time, and choose the most suitable product that has been customized based on their requirements from a wide range of selections. From a business perspective, B2C means that firms can eliminate the need for physical

stores and cost-effectively manage their inventories. At the same time, businesses can reach their customers directly regardless of geographical distance without the need for wholesalers and intermediaries. B2C, therefore, does not only offer lower overheads and operating expenses but also higher profit and a more extensive market base that can be easily expanded.

However, the adoption of B2C requires businesses to maintain good relationships and interactions with their customers. Unlike the business-to-business e-commerce market, in which transactions are made only between firms and customers who search for products or services for the use of their organizations, in B2C e-commerce, customers are paying for their individual, personal use. For this reason, the emotional attachment to brands and products may be as crucial as the practical values of the offered products and services. Sheth & Parvatiyar (1995) described the importance of a strong bond between businesses and customers as the following:

> When producers and consumers directly deal with each other, there is a greater potential for emotional bonding that transcends economic exchange. They can understand and appreciate each other's needs and constraints better, are more inclined to cooperate, and thus, become more relationship oriented.

As this happens, consumers will participate more often in loyalty programs and repeat their purchases (ibid). Moreover, in the current age where B2C is somewhat a norm and the range of available products and services is endless, it is so easy for customers to change their initial decisions and switch to other options just by the power of a click (Singh, 2002). Strong connection with customers helps firms improve retention rates, encourage repeat purchase behavior, and lower the tendency to switch, which would ultimately result in improved profits margin (Reichheld, 2001).

In the advanced world of technology, one of the most crucial and widely adopted approaches for B2C relationship building is customer data use. By collecting information about their customers, firms can better understand their consumers, including customers' needs, emotions, perceptions, and expectations. Moreover, with such detailed customer profiles, B2C firms can be assisted in personalizing their brands and products, which makes their artifacts more appealing to their potential customers. Thus, customer data has predominantly become a valuable resource in

which numerous B2C firms of different scales, from small to extra-large, extensively invest in (Boukis, 2019). This can be seen through the trend of data analysis and the rapid growth of related technologies, such as Big Data, Big Data Analysis, and Cloud Computing. For example, in 2020, Amazon expected to spend another USD 2.8 billion as an investment for its multiple data centers in southern India (Bloomberg, 2020).

However, as B2C firms become desperate for accessible customer data, consumer data privacy quickly becomes one of the most alarming issues of the era. Recent studies point out that wide and unauthorized access to personal data results in a reduction in consumer trust in the brand (Martin et al., 2017). Thus, instead of strengthening the B2C relationship, which is one of the main goals for using customer data analysis, the vulnerability of personal data privacy significantly weakens the bond between consumers and brands and can result in consumers faking personal information, spreading negative feedback, and switching to other brands (ibid).

In the field study, Martin et al. (2017) also point out that data vulnerability often comes from the anxiety of potential data misuse and emotional violation rather than the actual wrongful exploitation. For this reason, it is recommended for companies to either enhance the transparency of the data management process or provide their customers with more control in how their data is being employed or let customers manage it to their reference (Lee & Pilkington, 2017; Martin et al., 2017).

2.3. Disintermediation

2.3.1. The concept of Disintermediation

In 1996, Gellman introduced the term disintermediation to academics and researchers for the first time. The term can be denoted as a reduction in the use of intermediaries, or middlemen, between producers and consumers (Gellman, 1996). Regardless of the late birth of its official terminology, the possible removal of the trusted third parties between businesses and customers was previously discussed by Malone, Benjamin, and Yates in 1987 (Bailey & Bakos, 1997). According to these academics, in the age of the Internet and electronic markets, some of the

intermediary services provided in the traditional physical market would not be necessary. For example, in the world of no Internet, customers need to physically go to a shopping mall to access products and gather detailed information such as official prices and visual designs. A shopping mall, thus, provided producers with intermediate infrastructure and business-customer matching (ibid). However, in the electronic market, customers and brands would be able to directly interact with each other through the available information infrastructure with a much lower transaction cost (Tapscott & Tapscott, 2016). Thus, researchers predicted a reduction in the role of intermediaries and even possible complete elimination (Sarkar et al., 1995).

On the other hand, some researchers remained neutral towards the mentioned trend of disintermediation. It was argued that intermediaries could perform critical functions that contribute to more manageable exchange, lower transaction costs, and higher responsiveness to customer needs (Singh, 2002). These functions include aggregation, trust, facilitation, and matching (Sarkar et al., 1995; Jallat & Capek, 2001). Thus, while traditional roles of intermediaries might become unimportant in the e-commerce scenarios, new roles of intermediaries would be initiated, indicating that disintermediation would be a start rather than a complete end. By bypassing the conventional and unneeded intermediaries, disintermediation would allow new electronic intermediaries, or cybermediaries, to enter the market and create more meaningful value-adding activities (Sarkar et al., 1995; Bailey & Barkos, 1997). Thus, according to Jallat & Capek (2001), disintermediation would ultimately reorganize networks with substitution, form new types of business, and replace the existing supply chain with unconventional forms of reintermediation. For example, Amazon was mentioned as an alternative e-intermediary for network reorganization in the early dates of B2C. Two decades later, this cybermediaries is still thriving and has become the world's largest e-commerce store.

2.3.2. The target of Disintermediation in the current B2C context

In this thesis, the subject for disintermediation is intermediaries who can access the management data and filtration of data streams, including information brokers, search engines, advertisement, and communication platforms. Well-known examples of such cyber intermediaries may include media powerhouses such as Facebook,

Google, and Instagram. With the significant growth of social media and customer data analysis, more and more companies have been relying on these middlemen to reach out to potential customers and establish customer profiles that lead to better economic exchange. With their large customer data pool, the mentioned e-intermediaries assist businesses with personalizing their brand and products. Puthal et al. (2018:12) also acknowledge the role of e-intermediaries who provide firms with more customer data.

The benefits of such trusted third parties are undoubtedly recognizable. However, as their primary income arrives from data and targeted customers (Puthal et al. 2018), their unrivaled growth can lead to a set of undesirable outcomes. First of all, with their dominance in customer data mining, management, and filtration, these intermediaries can form an over-dependent effect and may easily lock B2C businesses into their platforms. Moreover, as customers become more aware of their digital identity and negative issues caused by the inappropriate use of their digital footprint, they have gained a much more sensitive attitude towards data mining and personal profile analysis, which lead to an alarming level of sensitivity towards data vulnerability (Martin et al., 2017).

Thus, this thesis suggests that the elimination of such intermediaries can foster stronger B2C relationships, which leads to the establishment of more customer-centric and profitable B2C businesses. For example, the growth of different innovative technologies, such as the Internet, mobile, and social media, has brought disruptive changes to the way of doing business. With the age of the Internet, the world expected a significant shift from brick-and-mortar to online business, which did happen and changed all business activities tremendously. Such business transformation is necessary to create more benefits and opportunities for both firms and customers. Thus, disintermediation does not mean an economy completely free of middle-men, but rather an encouragement for the re-intermediation of more advantageous and superior forms of middle layers (Zamani & Giaglis, 2018). In the current context of B2C relationships, disintermediation is crucial to replace the e-intermediaries with high data vulnerability, such as media powerhouses, with the better, stronger, surpassing intermediary (Tapscott & Tapscott, 2017; Zamani & Giaglis, 2018; Puthal et al. 2018). Zamani & Giaglis (2018) also refer to this post-disintermediation situation as a cybermediation outcome. In this prospect, the DLT

service providers can be possible new intermediaries who offer blockchain-based technology. Such outsourcing processes would enable firms to be unencumbered by the infrastructure and maintenance responsibility. As a result, companies can better locate their resources and further focus on their primary business activities (ibid).

2.4. Conceptual Framework

In figure 2, the positive relationship between blockchain, disintermediation, and B2C relationship management is illustrated. However, due to the novel characteristic of blockchain studies in B2C relationship management, there is a gap in existing frameworks for researching blockchain-based disintermediation. Thus, the figure below is an original work of the writer, in which cause-effect relationships are significantly considered.

The ground setting problem that triggered the whole research is data privacy and data vulnerability caused by the dominance of intermediaries who have access to the management data and filtration of data streams. To solve this problem, a shift in the marketing model, i.e., disintermediation, can be achieved using blockchain. The inter-square between blockchain, disintermediation, and B2C relationship building explains the values that connect these three concepts, including data decentralization, data transparency, data immutability, and data security.

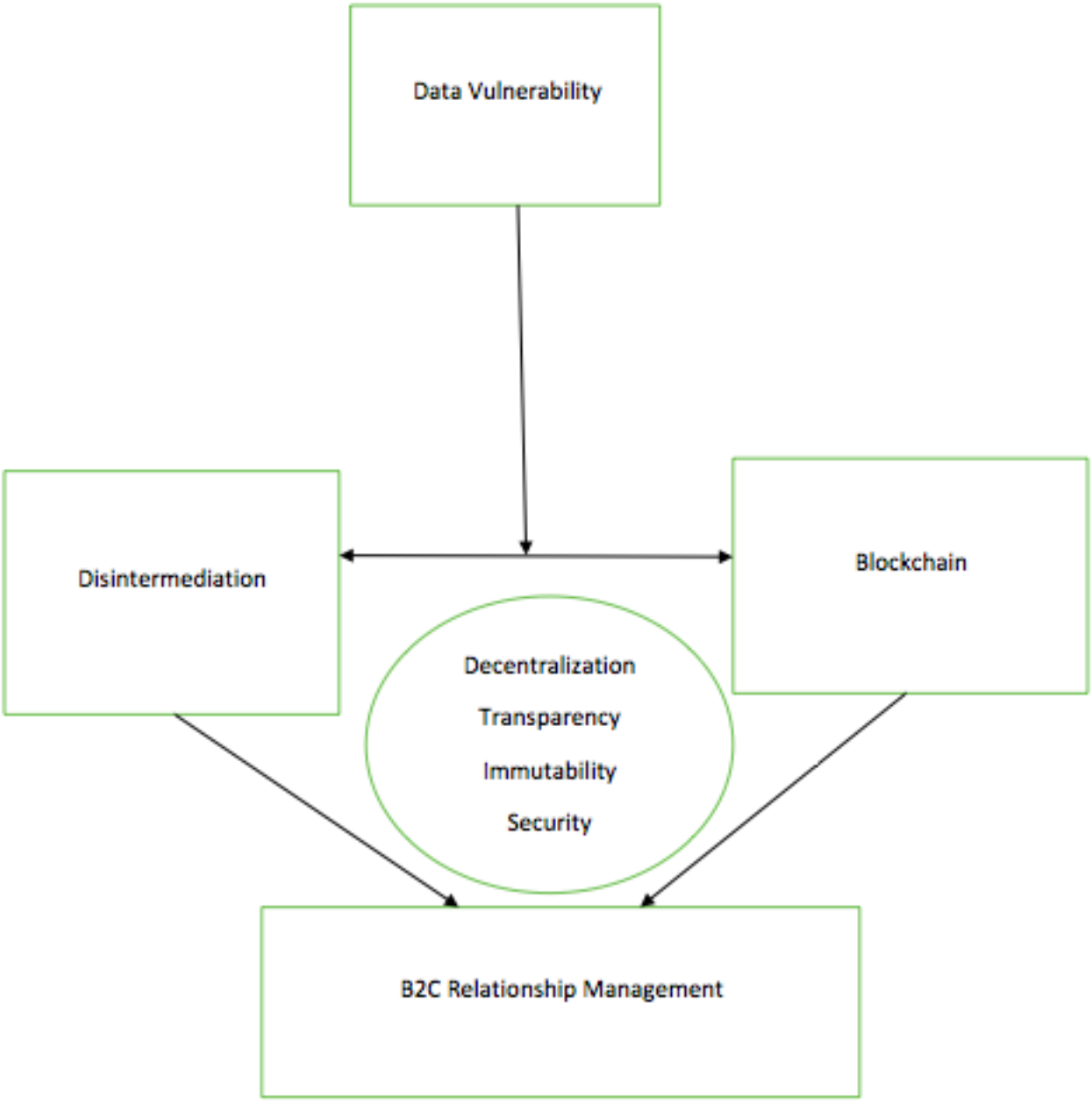

Figure 2: Conceptual Framework

2.5. Conclusion

The literature review aims to explain the key concepts regarding blockchain, B2C relationship, and disintermediation. Often regarded as an innovative technology, blockchain has the power to disrupt various business activities, some of which go beyond the initial focus areas of blockchain: finance and payment systems. This is due to blockchain's underlying features and working process, which lead to its

unique set of properties, namely decentralization, transparency, immutability, and security. B2C, on the other hand, is a business model that has become increasingly popular through the 1990s Internet boom. While being favored for its accessibility, one of the most critical challenges in the B2C market is maintaining a significant customer-brand relationship. The recent years, however, witness the growing trend of customer data mining, data filtering, and in-depth data tracking, which increase the concern of data privacy and weaken the vital B2C relationship. As a solution to this critical issue, the reduction or even elimination of intermediaries involved in the data management and filtration process is highly suggested. While not leading to an intermediaries-free business system, such disintermediation would encourage the re-intermediation of better and more effective forms of middle layers. Through this literature review, it can be concluded that there is a relationship between blockchain-based disintermediation and B2C, which could lead to meaningful research objectives. However, it is notable that the intersection between blockchain and B2C relationship management is still a new research area, and more research effort from academics, institutions, and firms is required to establish a more in-depth view of the topic.

3. METHODOLOGY

In this thesis, the author decided to address and analyze the research questions in two different parts: a systematic literature analysis and a presentation of cases. With the combination of these two researching methods, the author hopes to possibly collect the most insightful information about how blockchain can be encouraged for disintermediation and enhance B2C relationship building in the B2C market.

3.1. Systematic Literature Analysis

The first part is a systematic literature analysis, in which the author performed a systematic literature search and selection to choose the articles mostly related to the topic of study. The systematic selection in this first part aims to logically locate

articles that discuss either how blockchain-based disintermediation can affect B2C relationship building or mention real-life businesses that use blockchain to foster disintermediation and enhance B2C relationships. The entire list of articles collected from the initial search was organized and screened by the author of this thesis, an undergraduate student at Aalto University School of Business. After being selected, the argument from different views and perspectives discussed in these articles will be evaluated to provide a possible synthesis and draw meaningful findings.

3.1.1. Inclusion and Exclusion Criteria

For an article to be eligible, it must conform to the following inclusion/exclusion criteria:

- The included articles must be written in English.
- The article must discuss how blockchain, disintermediation, and B2C relationship building interact and create significant impacts on each other.
- Alternatively, the article must provide a case study of businesses related to the topic of the research.

3.1.2. Information sources and Search Strategy

For the initial article search, the search term ‘blockchain AND disintermediation AND relationship’ was utilized on 6 databases. This resulted in a total pool of 3813 articles that mentioned the three keywords’ blockchain’, ‘disintermediation’, and ‘relationship’ in their full text. Instead of the term ‘B2C relationship’, the term ‘relationship’ was selected as a keyword. This is because ‘B2C relationship’ can sometimes be phrased as ‘customer-brand relationship’ or ‘business-consumer relationship’. Thus, replacing ‘B2C relationship’ with just ‘relationship’ would maximize the amount of related study collected.

This initial search was performed on 6 databases and resulted in a total of 3813 relating articles: Web of Science (3), ACM digital library (24), IEEE Xplore (58), the AIS Electronic Library (126), ScienceDirect (122), Google Scholar (3480). Out of the

6 databases, Google Scholar was the only one that requires additional tools for article extraction. Hence, the author chose the Octoparse web scabbing tool to perform this activity. However, Google Scholar only showed a maximum of 1000 search results. Thus, the actual number of articles collected after the initial search and screened for abstract was 1333. Additionally, blockchain has only been a popular research area since 2017, and the application of blockchain in customer relationship management, the sector on which this thesis is based, is an even newer research area. Thus, the author did not put any date restriction as all of these articles would still be relevant to the study.

3.1.3. Systematic Study selection

Due to the search limitation of Google Scholar, the actual number of articles screen was only 1333 instead of 3813. Eventually, after the abstracts screening, 1209 articles were eliminated. These articles were excluded due to a couple of reasons. First and foremost, many of these articles focused on the effects of blockchain-based disintermediation in areas other than B2C relationship building, such as finance, supply chain management, the music industry, healthcare, and government. The next popular reason for elimination was the over-general approach of articles. A significant number of articles mention how blockchain-based disintermediation can be a cure to many industries in which intermediaries have slowly become a problem due to their extensive power. However, sector-or-industry-specific discussions were not carried out in these articles. Finally, many articles were eliminated due to repetition in search results or full-text not available in English.

After the first stage of screening, the author continued to access 124 full-text articles and ended up keeping only 8 articles for the systematic literature analysis. The 116 eliminated articles were all somewhat related to the intersection of blockchain, disintermediation, and B2C relationships. However, the information discussed in these articles does not directly mention how blockchain-enabled disintermediation can affect B2C relationships. For example, multiple articles view blockchain under the angle of distributed cloud data enablers, making information storing more efficient, secure, and cost-saving. By using such cloud services, firms are also replacing untrustful middlemen involved in the data management process with the

more reliable ones. The result of this adjustment is similar to the scenario of cybermediation, in which firms outsource the burdensome blockchain-based information or marketing system to the DLT service providers so that firms can focus more on their primary business activities.

In figure 3, the study selection was visualized using a flowchart to better explain the entire process. The author also included table 1, in which the detailed information of the selected articles is specified.

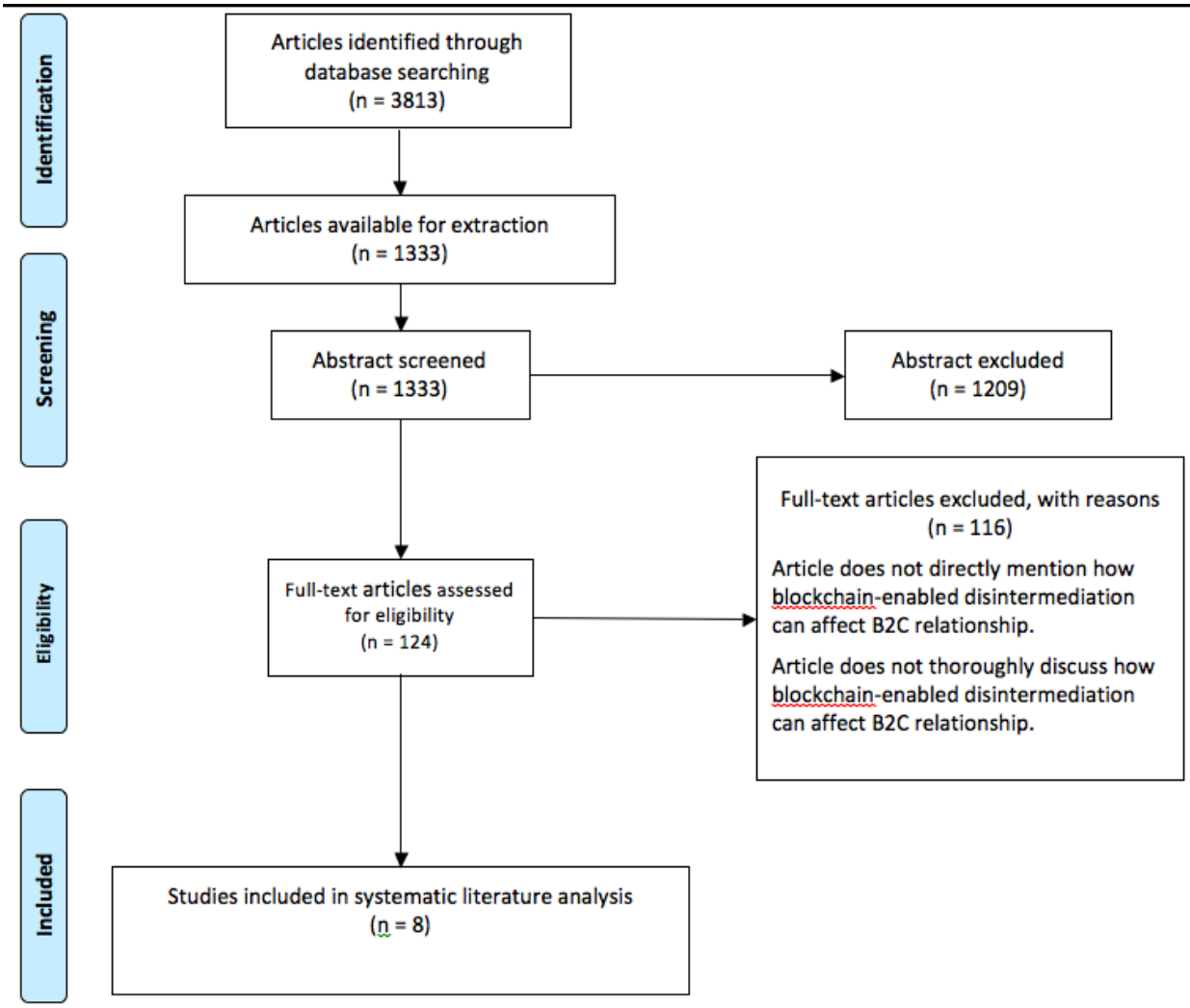

Figure 3: The systematic selection of articles based on the 'Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement' (Moher et al., 2009)

Article	Author/ Authors	Year	Title
1	Antoniadis, I., Kontsas, S. & Spinthiropoulos, K.	2019	Blockchain Applications in Marketing
2	Boukis, A.	2019	Exploring the implications of blockchain technology for brand–consumer relationships: a future research agenda
3	Chen, W., Xu, Z., Shi, S., Zhao, Y. & Zhao, J.	2018	A survey of Blockchain Applications in Different Domains
4	Epstein, J.	2017	Blockchain and the CMO: The Next Era of Marketing
5	Ertemel, A.V.	2019	Implications of Blockchain Technology on Marketing
6	Kumar, V., Ramachandran, D. & Kumar, B.	2021	Influence of new-age technologies on marketing: A research agenda
7	Mitselmakher, K.	2019	Demystifying Blockchain: A New Wave of “Creative Destruction” or Hype?
8	Rejeb, A., Keogh, J. & Treiblmaier, H.	2020	How Blockchain Technology Can Benefit Marketing: Six Pending Research Areas

Table 1: The 8 articles selected for analysis

3.2. Brief Presentation and Analysis of Cases

The second part of the research presents two cases of companies that adopt blockchain to encourage disintermediation and assist B2C relationship building. These cases are extracted from the 8 articles collected from the systematic selection, which was performed in the first part of the research process. After collecting information on the cases, the author would conduct an additional search

on Google Scholar and these companies' websites to select the most relevant ones. Out of these relevant companies, the two discussed the most among the 8 selected articles would be chosen for the case presentation and analysis.

3.2.1. Inclusion and Exclusion Criteria

For a case to be eligible, it must conform to the following inclusion/exclusion criteria:

- The case needs to be built around the concept of Blockchain-based elimination of data-related intermediaries and its effects on B2C relationship building.
- The case must have direct impacts on B2C relationship building.

3.2.2. Case selection

Total number of case utilizing blockchain found in the 8 selected articles: 76

Number of cases eliminated due to irrelevant to the topic of the thesis: 72

Most of these cases were removed from the final consideration list because their blockchain-based disintermediation approaches were not customized for a B2C relationship-building focus. For example, some cases were found in more general studies that discussed not only blockchain in B2C relationship management or marketing but also blockchain in finance, real estate, and various other fields. Thus, these cases were built to address the problems prevalent in these sectors and somewhat irrelevant to this thesis. Additionally, a significant part of eliminated cases focused on business-to-business (B2B) rather than B2C relationships. For instance, many firms (such as adChain or Adshare) were established to improve the collaboration between advertisers and publishers instead of improving the relationship between businesses and consumers. For such reasons, a significant number of cases were eliminated. Besides, there were cases designed for the use of customers instead of B2C firms. Customers would use these services to protect their data on cloud storage or simplify the identification verification act between different platforms and digital media. There is also a remarkable quantity of cases that focus

on providing more secure and effective customer data collection, tracking, and analysis. However, they somehow lack the control factor from the customer perspective, and for that reason, were not included in the final list.

Cases evaluated based on the number of time discussed in the 8 selected articles: 4

- Basic Attention Token (BAT) (4)
- BitClave (1)
- Madhive (2)
- uPort (3)

As the most cited companies, BAT and uPort would be used for the case presentation and analysis. In table 2, the articles from the study selection that discussed either BAT or uPort are listed.

BAT	Boukis, A. (2019) 'Exploring the implications of blockchain technology for brand–consumer relationships: a future research agenda.' Epstein, J. (2017) 'Blockchain and the CMO: The Next Era of Marketing.' Ertemel, A.V. (2019) 'Implications of Blockchain Technology on Marketing.' Mitselmakher, K. (2019) 'Demystifying Blockchain: A New Wave of "Creative Destruction" or Hype?'
uPort	Boukis, A. (2019) 'Exploring the implications of blockchain technology for brand–consumer relationships: a future research agenda.' Epstein, J. (2017) 'Blockchain and the CMO: The Next Era of Marketing.' Ertemel, A.V. (2019) 'Implications of Blockchain Technology on Marketing.'

Table 2: Articles discussed BAT or uPort

4. ANALYSIS

4.1. Literature analysis: How can blockchain-enabled disintermediation impact B2C relationship buildings?

The systematic literature selection allowed the author to finalize 8 articles that related the most to the topic of blockchain-enabled disintermediation and its effect on B2C relationships. Under these 8 articles, only one article directly focuses on the customer relationship department, which is 'Exploring the implications of blockchain technology for brand-consumer relationships: a future research agenda' written by Boukis in 2019. Although not entirely concentrated on this aspect, the other articles approach the researching topic from the perspective of marketing, which makes them suitable for this analysis.

This literature analysis would be divided into two parts based on the 8 articles and the first research question of 'How can blockchain-enabled disintermediation impact B2C relationship building?' The first part analyses the role of intermediaries involved in the data management and streaming process as well as the threats that these middlemen bring with their extensive power. In the second part, blockchain-encouraged disintermediation is introduced with its positive impacts in B2C relationship building and some critical issues regarding blockchain-based solutions.

4.1.1. A B2C market where the data-related intermediaries have too much power

4.1.1.1. Why are these intermediaries necessary for B2C firms?

Apart from the direct sellers, a significant part of the current B2C market is accumulated by intermediaries who perform different layers of value-adding activities for firms and customers (Mitselmakher, 2019; Rejeb et al., 2020). Under this thesis, the intermediaries of discussion are middlemen whose value proposition lies in the data processing. Instead of offering products and services to the end-users, these companies generate values through user data and target advertisements (Rejeb et al., 2020). By operating a platform where users can share or search for information, these intermediaries collect the data from their users to establish user profiles. After that, these intermediaries might utilize this enormous amount of data to develop their platforms further and attract even more users or might be purchased by other firms for different purposes of usage (Ertemel, 2019). These organizations can assist B2C

firms in activities such as data collection and analysis, customer network development, and brand popularization.

Media powerhouses such as Facebook, Google or giant digital marketplaces such as Amazon are well-known examples of such a business model. These companies are the most significant players in the current advertising market (Mitselmakher, 2019). By performing target advertisements for B2C firms, the giant Google collected 110.9 billion US dollars in 2018 (ibid). With such extensive impact in the digital world, these intermediaries help B2C firms not only to approach potential customers through target advertisement but also learn more about their customers, the market trends, and the needed product adjustment through the data-driven decision-making process (Epstein, 2017; Ertemel, 2019; Rejeb et al., 2020). Besides these data aggregators and advertising platforms, firms also employ a complex layer of intermediaries employed by B2C firms, including “demand-side platforms (DSPs), supply-side platforms (SSPs), tax collectors, agencies, exchanges, data aggregators, data sellers, content providers, and others for their marketing related activities” (Mitselmakher, 2019: 27). Thus, B2C firms generally need these data intermediaries for many essential things: customer data collection, customer network development, brand polarization to product development, customer relationship management, and other marketing-related activities.

4.1.1.2. What are the alarming problems that they bring with their dominance?

Although these information brokers and media platforms can offer a significant list of value-adding activities, their massive dominance in the customer data-related activities gradually introduces problematic issues to the value chain. Some of these problems even threaten the B2C business efficiency performance, especially in the realm of customer-brand relationships (Boukis, 2019; Rejeb et al., 2020). The uneven distribution of information power between such data-related intermediaries, firms, and customers not only increases the cost and locks firms into these platforms but also prevents the establishment of transparent, secured, and tamperproof data management processes (Epstein, 2017; Rejeb et al., 2020).

From a customer perspective, such complex layers of data intermediaries result in three intriguing problems.

Firstly, in the current data management systems, customers are not provided with enough control over who can access their data and what data protection procedures and policies these parties have (Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019). Thus, customers are forced to experience considerable uncertainty of data insecurity, risk of being exposed to data thieves, and illegal data usage (Epstein, 2017; Boukis, 2019; Rejeb et al., 2020). This situation is even more undesirable as these data can include a significant amount of personally identifiable information (PII). Such an acute sense of data vulnerability reduces customers' trust in B2C firms and damages B2C relationships. Additionally, the fear of being exposed to data damages results in customers' actions such as hiding or faking personal data or even abandoning particular products or services, which is not beneficial for both firms and customers in the long-term B2C relationships (Boukis, 2019; Rejeb et al., 2020).

The second negative outcome worth mentioning is how customers do not receive any considerable benefits for sharing their data (Mitselmakher, 2019). It is user data that leads to the establishment of multiple intermediaries and B2C giants. However, customers, the actual owner of all these sources, hardly earn anything except the customization of products and services, which is the responsibility of B2C firms (Epstein, 2017; Mitselmakher, 2019). Customization is an inevitable trend of this era. Customers might be willing to share their data as they prefer products and services customized to their preferences. Simultaneously, the unclear data procedure and data vulnerability also cause customer hesitation, which leads to a data dilemma for both customers and firms. Thus, when considering this situation, the dominance of data intermediaries results in considerably unfair treatments for the customer: not only do customers barely receive any significant benefits from their contributions, but they would also face the risks of illegal usage of their PIIs (Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019).

Finally, these complex layers of middlemen between customers and firms prevent customers from directly communicating their needs and wishes to the firms and participating in a value co-creation process (Epstein, 2017; Boukis, 2019; Rejeb et al., 2020). Thus, customers cannot maximize the value they can receive from sharing their information, including losing the chance to have products and services perfectly customized for them or receiving the information they are not interested in

(Boukis, 2019). Consumers seem not to favor free attention anymore, and the trend of ad blocking has become much more noticeable over the past few years (Rejeb et al., 2020). According to Epstein (2017), ad-blockers are used by over 600 million devices worldwide.

From the perspective of B2C firms, such dominance also results in incomparable, if not even more, negative issues. The centralization in data power allows these data intermediaries to trap B2C firms into their platforms, significantly reducing the voice and flexibility of firms in decision making (Epstein, 2017; Rejeb et al., 2020). Moreover, the more parties involved in a procedure, the more firms have to pay. As Mitselmakher (2019) argued, on average, 40 cents of every dollar that firms spend on digital advertisement goes to intermediaries. Epstein (2017), on the other hand, mentioned that this number could go up to 79 cents for every dollar spent. Regardless of the correct approximation, these two arguments share the same opinion: firms depend and spend too much on data intermediaries (Epstein, 2017; Rejeb et al., 2020).

Despite their high cost, the complexity in the layers of data intermediaries might bring significant insecurity, non-transparency, and inauthenticity into the data management process, which prevents firms from having a complete understanding of where their valuable resources, i.e., money and data, are being handled and if they are achieving the expected goals. A study shows that, for every dollar spent on advertising, firms only receive 44 cents of real value (Epstein, 2017). Several studies also point out how intermediaries are not effective with their responsibilities. Yahoo, for example, was not serving up to 30-70% of ads of the locations they claimed (Mitselmakher, 2019). On the other hand, Facebook had been exaggerating their video advertising metrics by 60-80% for two years (ibid). These ad frauds are just a modest part of how data intermediaries dominate the B2C relationship realm for their goods. Within such a complicated multi-layers data management process, the visibility of firms in data-related customer activities is necessarily reduced (ibid). Indeed, B2C firms' valuable data resources are even more exposed to loss, leakage, or tamperer, all of which can result in considerable damage to the firm image, B2C relationship, and actual business performance (Epstein, 2017; Boukis, 2019; Mitselmakher, 2019).

Another unwanted outcome of too many data mediators is the indirectness in the data transformation process, which prevents firms from maximizing what customer data and customer relationships can bring to the value chain (Epstein, 2017; Boukis, 2019; Mitselmakher, 2019; Rejeb et al., 2020). These interlayers challenge the integrity of the data stream and the information preservation process, which might cause considerable fraud in data collection, interpretation, and utilization. Customers might refuse to provide firms with valuable data by faking their personal information, or they might also refuse to receive promotional data with the use of ad blockers if firms are employing the wrong targeting strategy (Epstein, 2017; Mitselmakher, 2019; Rejeb et al., 2020). Moreover, the uncertainty in the current data management damages brand image and B2C relationship by establishing the negative feelings associated with the brands and their product, which decrease firms' performance (Boukis, 2019).

4.1.2. Blockchain-based disintermediation: The next positive thing for B2C relationship

Often referred to as the trust-machine, the information in a blockchain-based network cannot be controlled, dominated, and overshadowed by any centralized parties. Thus, blockchain can offer B2C firms the desirable transparency, security, and authenticity in their data processing (Antoniadis et al., 2019; Boukis, 2019; Rejeb et al., 2020). Moreover, the decentralized nature of blockchain means that firms can achieve these data management goals with less or without the need for trusted third parties. Such blockchain-based disintermediation simplifies data middlemen's layers and offers firms and customers more control over valuable data sources (Epstein, 2017; Boukis, 2019; Mitselmakher, 2019; Rejeb et al., 2020). As a result, firms can protect customer PII and minimize the emotional violation associated with data misuse uncertainty, which improves B2C relationship building (ibid).

4.1.2.1. What blockchain can bring to solve the mentioned alarming problems and bring better B2C relationship building?

From a technical perspective, blockchain-enabled disintermediation can offer valuable data management breakthroughs, including integrity, traceability,

immutability, security, and decentralization (Antoniadis et al., 2019; Boukis, 2019; Mitselmakher, 2019; Kumar, 2021). Such strengths allow blockchain to enable and establish 'trust' between business and customers effortlessly and remove the need for any trusted third parties previously involved in their processing of customer data (Epstein, 2017; Chen et al., 2018; Antoniadis et al., 2019; Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019; Rejeb et al., 2020; Kumar, 2021). Such disintermediation would reduce cost, complexity, and the problems that come with these intermediaries' layers (ibid).

From a customer perspective, blockchain-based disintermediation allows customers to own their personal information and eventually have more control over how these properties are being used (Epstein, 2017; Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019; Kumar, 2021). As a decentralized technology, every transaction made on a blockchain-based system is peer-review. Hence, customers are aware of who wants to use their data and can choose to give them access or not (ibid). Moreover, as a secure information system, customers can be assured of how their data is protected, which would lessen the risk of data leakage, damage, and misuse. Such improvement in data security would encourage customer trust and relationship with firms and prime the value-co creation and B2C relationship-building process (Epstein, 2017; Boukis, 2019; Rejeb et al., 2020).

Additionally, as blockchain-based systems offer customers solid ownership of their data, firms will gradually have to pay customers for their attention and any legal access to such information (Epstein, 2017; Antoniadis et al., 2019; Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019). Not only do they not have to experience negative feelings toward data uncertainty and violation, but customers can also actually earn from their information assets, similar to how one would rent out their house or car to a responsible party. Such a data collecting process would provide customers with an incentive to provide firms with more truthful and valuable data instead of hiding and forge it like before (Epstein, 2017; Antoniadis et al., 2019).

The last thing to mention from a customer perspective is how B2C relationships would be enhanced thanks to the elimination of unnecessary middle parties, and so do the relating benefits (Boukis, 2019; Rejeb et al., 2020). As the integrity and authenticity of information are well-preserved, firms and customers can rely on each

other for effective data-driven decision-making. Thus, firms would better understand their customers and provide the best products and services to the needs of only their precisely targeted customers (Epstein, 2017; Chen et al., 2018; Antoniadis et al., 2019; Boukis, 2019; Mitselmakher, 2019; Rejeb et al., 2020). Customers will be able to avoid being bombarded with advertisements and instead focus on only the things that they want to pay attention to. Additionally, blockchain-based disintermediation allows customers to participate in meaningful loyalty programs desired based on their needs (Epstein, 2017; Antoniadis et al., 2019; Boukis, 2019; Rejeb et al., 2020).

From a firm perspective, the elimination of under-performing data intermediaries will also remove the complexity and cost of the entire data management process and customer relationship management (Antoniadis et al., 2019; Mitselmakher, 2019; Rejeb et al., 2020; Kumar, 2021). With blockchain, security, integrity, and trustworthiness can be cost-effectively established between customers and brands (Epstein, 2017). Hence, firms can spend less and become more effective in attracting, understanding, and maintaining more customers in their networks, which equals a higher return on investment. Moreover, blockchain-based disintermediation allows firms to plan their goals better and track the following results (Mitselmakher, 2019; Kumar, 2021). Instead of excessively paying different intermediaries and still risk losing customers, firms can directly pay targeted customers for their attention and receive better, more accurate customer data without violating B2C relationships (Epstein, 2017; Boukis, 2019). Besides reducing cost for customer acquisition and retention, blockchain-based disintermediation also offers B2C firms lower costs of storing, accessing, and protecting customer data (Antoniadis et al., 2019; Mitselmakher, 2019). Blockchain's underlying protocols offer this technology better security, tracing, and operating facilities, which makes blockchain-based systems collision-resistant and free of single-point failure. Epstein (2019) phrase the impacts of blockchain in the processing of data as the following:

> Blockchains will give marketers greater confidence in the integrity of the data they access. Immutable entries, consensus-driven timestamping, audit trails, and certainty about the origin of data (e.g., a sensor or a kiosk) will improve as blockchain technology becomes more mainstream.

Such a data collecting process encourages customers to pay more attention to firms and contributes to the value chain and B2C connection (Boukis, 2019). These improvements in customer data resources would result in better analysis and interpretation of the potential customer, which can help firms with not only more precise target marketing and customer reaching but also better personalization of their products, services, and brand (Epstein, 2017; Chen et al., 2018; Boukis, 2019; Mitselmakher, 2019; Rejeb et al., 2020; Kumar, 2021). For example, with more precise customer targeting, firms can avoid the growing trend of ad-blockers and not wasting their resources on the incorrect recipients (Rejeb et al., 2019). Moreover, the pay-for-attention data collecting and spreading process means that firms need an adequate transaction system that supports precise digital micro-payments (Epstein, 2017). With its cryptocurrencies and strengths in transaction making and tracking, blockchain would be the most appropriate candidate for the debate.

Last but not least, the direct communication enabled through disintermediation would enrich firms' understandings of their customers and strengthen B2C relationships, through which brands can achieve meaningful business and customer insights without losing the desired brand image (Chen et al., 2018; Boukis, 2019; Rejeb et al., 2020). Moreover, as customers re-construct trust in the data management process of firms, they are more willing to provide firms with accurate data and lead to a circle of better resources to understand and establish relationships with customers (Epstein, 2017; Antoniadis et al., 2019; Boukis, 2019; Rejeb et al., 2020).

4.1.2.2. Why is blockchain a disintermediation-encouraging solution?

According to many researchers, blockchain will prime the time of true disintermediation, instead of just the re-intermediation of the World Wide Web (WWW). With the birth of WWW, disintermediation of traditional intermediaries, in which these trading mechanisms would be removed and replaced by electronic intermediaries, was expected (Ertemel, 2019; Rejeb et al., 2020). However, such e-intermediaries, after being introduced to the market, rapidly expanded their roles and encouraged re-intermediation, in which a significant amount of value chain and market power were realigned to them (ibid). Consequently, their rapid growth leads to an imbalance in market power and threatens businesses and customers' goods.

Blockchain would be a considerable option to dismiss this undesirable situation (Epstein, 2017; Ertemel, 2019). By providing a trust machine for businesses and customers in the processing of data, blockchain eliminates the need for multiple central third parties existing in the current data management process (Chen et al., 2018; Antoniadis et al., 2019; Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019; Rejeb et al., 2020; Kumar, 2021). Such simplification in the procedure equals redistribution of data power to firms and customers, and hence the concept of blockchain-based disintermediation. Through blockchain, the previously inefficient middle layers are removed or sometimes replaced with the more reliable ones, even those that were not possible before (Epstein, 2017; Boukis, 2019; Ertemel, 2019). For example, before blockchain, the concept of pay for attention and micropayments were somewhat more challenging and impossible for execution. With blockchain-encouraged disintermediation, firms pay the ones who should have been paid for their contribution, i.e., the customers (Epstein, 2017; Antoniadis et al., 2019; Boukis, 2019; Mitselmakher, 2019). Moreover, the cost per customer for every activity is now much lower as firms have eliminated a considerable amount of middlemen whose investments are not worth the return (Epstein, 2017; Mitselmakher, 2019; Rejeb et al., 2020).

Additionally, in terms of efficiency, firms now have a more secure data management system that is tamper-proof, immutable, and transparent, meaning that firms can have more control over what is going on (Boukis, 2019; Kumar, 2021). In short, B2C firms can achieve more with less money spent.

4.1.2.3. What are the issues for consideration?

Blockchain and blockchain application in B2C relationship management and marketing, in general, is still experiencing the earlier phase of an innovative topic (Antoniadis et al., 2019). Despite its remarkable potential, the technology and its concept are not yet perfect, mature, or ideal for every business case (Epstein, 2017; Boukis, 2019; Ertemel, 2019). For such reasons, firms should conduct thorough research before applying a blockchain-based solution to achieve the most desirable outcomes. Moreover, due to its infancy nature, it would take a considerable amount of time and resources until blockchain-based disintermediation and re-aligning with

data power would genuinely happen, in which customers can genuinely control their data (Boukis, 2019; Ertemel, 2019).

Indeed, despite its higher return over investment, storing and processing data on blockchain is relatively more complicated and expensive than traditional databases (Rejeb et al., 2020). The consensus mechanism in blockchain allows it to own distinctive and outstanding security, privacy, and disintermediation features. Simultaneously, this authentication protocol results in a consensus dilemma due to excessive amounts of information that need to be stored and processed for every transaction. Such dilemma is especially true for PoW-based blockchains, in which maintenance cost, scalability, and energy consumption can sometimes offset the values generated from blockchain-based disintermediation, security, and integrity (Boukis, 2019; Ertemel, 2019; Rejeb et al., 2020). Moreover, under the scope of customer-brand relationships, the excessive amount of energy consumption and carbon emission caused by blockchain can be seen as negligence of social and environmental responsibilities, which is not preferable and might damage the brand image and B2C relationship. Thus, the consensus protocol is a gift and a threat to any blockchain-based system. Hence, the industry experts are still working on improving these technical limitations and fully utilizing blockchain potentials (Antoniadis et al., 2019). PoS, for example, is an ameliorated version of PoW that can improve transaction efficiency and reduce electricity consumption and environmental damages. Thus, although blockchain is not yet perfect, it is possible to overcome the consensus dilemma and leverage this technology.

On the other hand, blockchain is a flexible and customizable technology, which might allow firms to minimize consensus dilemmas in some instances. There are many types of blockchain available at the current development phase with different central touch and control levels in the transaction process, such as public, consortium, and private. A public blockchain, for example, is a fully open distributed ledger with permissionless and open access, which makes it the most decentralized, immutable, and suitable for transparency-oriented solutions (Antoniadis et al., 2019; Rejeb et al., 2020). However, open access means that public blockchains have higher operation cost and more extreme consensus problems. On the other side of the spectrum, private blockchain offers a closed ledger in a closed network of only one organization and requires central permission for every operational activity. Thus, it gives firms

maximum control, maximum executing speed, and minimum cost over their blockchain solution, which makes private blockchain preferable for internal use (Antoniadis et al., 2019; Rejeb et al., 2020). Last but not least, consortium blockchain is a combination of a public and private blockchain, in which some features are restrictive while some stay open to the public users (Antoniadis et al., 2019). Such design allows consortiums blockchain to be open, secured, and more efficient and scalable, making it suitable for collaborative applications in industries such as finance, media, and telecommunications (Rejeb et al., 2020). Rejeb et al. (2020) recommend the use of different types of blockchains as the following:

> Brands wishing to retain their traditional business and governance models may, therefore, consider the adoption of private blockchain...consortium blockchains are the most suitable solutions for interdisciplinary, cross-industry applications in areas such as financial services, media, and telecommunication...Public blockchains are especially useful for brands that seek to capitalize on transparency in order to deliver consumer value.

As each blockchain type suits a distinct purpose, firms might need to thoroughly review their goals before adopting a blockchain solution to maximize the potential benefits. It should also be noted that although blockchain-based disintermediation can improve B2C firm effectiveness in the processing of data and, consequently, B2C relationship building, firms must prove the value and mutual benefit of data sharing to consumers to earn and re-earn access to these personal properties (Boukis, 2019). This proof can be solid data security, value co-creation advantages, or actual micropayments. Moreover, as consumers control their data and participate in this blockchain-based value chain, every user might receive a copy of every data transaction due to blockchain peer-to-peer authentication. Hence, it is the insights rather than the raw customer data that would be one of the most valuable resources for B2C firms (Epstein, 2017; Boukis, 2019).

4.2. Presentation and Analysis of Cases: BAT and Uport

This section presents and analyzes BAT and uPort to fulfill the second research question of 'What are the real-life cases that utilize this possibility of blockchain?', i.e., which companies use blockchain-based disintermediation to enhance B2C

relationship building. The major sources for analysis are the companies' websites and articles from the study selection that mentioned BAT (4) and uPort (3). Besides these resources, the author also uses relevant articles and reports collected from the additional search.

4.2.1. BAT

4.2.1.1. Business model

The full name of BAT, or Basic Attention Token, provides hints for what it offers to the users. According to the company white paper, BAT is a payment system that operates based on the giving and receiving of attention, and the payments are made using crypto-currency, i.e., the BATs (Brave Software, 2021). As an Ethereum-based or blockchain-based solution, BAT is claimed to protect and reward the users while providing better conversion to advertisers and higher returns to the publishers or content creators (ibid).

As illustrated in figure 4, customers would be paid for their attention to content that promotes a firm's information. On the other hand, content creators and publishers are not only paid by firms based on the popularity of those content but can also be rewarded by their audience for suitable materials. As the last party and the primary payer involved in this circle, B2C firms would be able to run more efficient targeted advertisements and get the attention from the real, authenticated customers without risking their B2C relationship. Besides, during this entire process, user data is strictly protected using an anonymity shield, in which users' attention and information are privately tracked via the Brave browser, the 'mother' of BAT, and these data will never leave their devices.

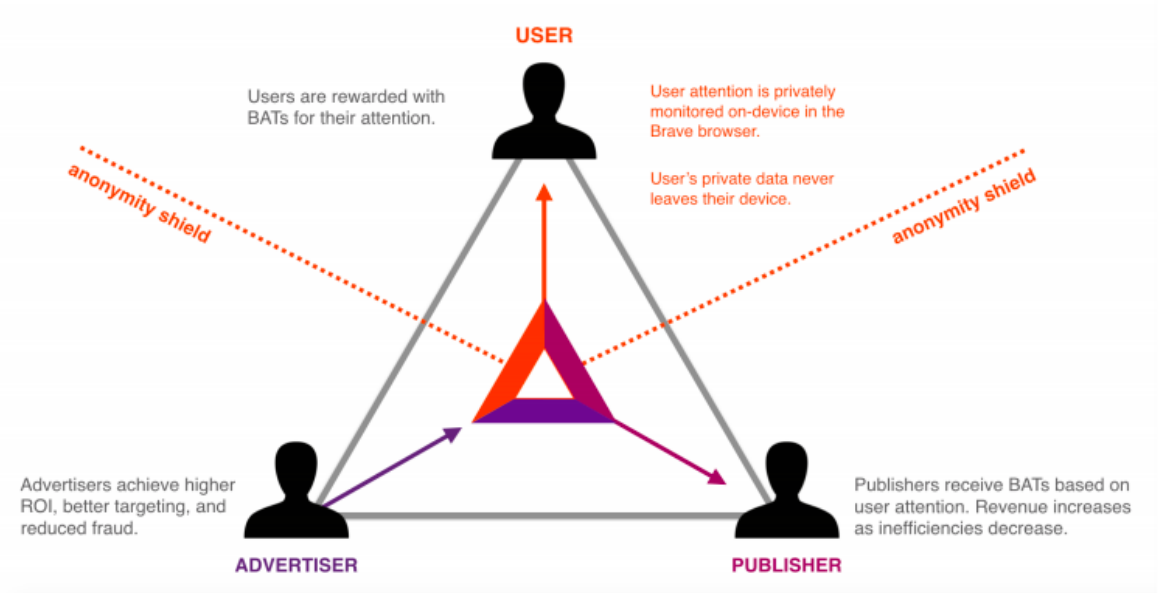

Figure 4: BAT Digital Ad Flows (Brave Software, 2021)

Initially designed as a rewards system for the Brave Browser users, BAT has expanded its utility thanks to its outstanding features. By February 2021, this token had attracted over 3.8 million monthly transacting users within the Brave ecosystem and had over 13 million BAT rewards wallets created (Brave, 2021). With more than 1 million verified publishers accepting BAT, by April 2019, BAT has served over 2,500 ad campaigns from over 400 advertisers in more than 190 countries worldwide (ibid).

4.2.1.2. Value proposition

In the white paper, Brave Software (2021) refers to BAT as a crucial part of future web standards, in which the problem of content monetization and user privacy would be mutually resolved.

As a blockchain-native payment system, BAT inherits the power of disintermediation. By working with Brave browsers, BAT matches users with content that was perfectly targeted for them, rewarding these authentic views for their attention, and pay content creators based on the contribution to the popularization of the information (Boukis, 2019; Mitselmakher, 2019; Brave Software, 2021). Thus, BAT can perform many middle activities and help firms cut the cost and problems associated with the removed intermediaries (Epstein, 2017; Boukis, 2019; Mitselmakher, 2019). Moreover, as BAT connects users, brands, and content creators directly, the

information sharing and value co-creating process will carry out more smoothly, similarly to how blockchain-encourage disintermediation is discussed to benefit firms in B2C relationship building. Instead of data intermediaries, it is consumers who can use their personal information for monetization purposes (Epstein, 2017; Boukis, 2019; Ertemel, 2019; Mitselmakher, 2019; Brave Software, 2021). As Brave browser stores users' data on their devices instead of Brave's central database, users have more confidence in their PIIs security (ibid). Thus, through BAT, firms can introduce the users with the right ad at the right time but without damage, the privacy denominated by relevant user attention (Epstein, 2017, Boukis, 2019).

Moreover, BAT is built with an anti-ad-fraud design. The user rewards and ad payouts will be rated limited and distributed over time to reduce ad bot operations' appeal (Brave Software, 2021). Hence, firms can achieve all these marketing and customer data-related goals with no social and economic cost associated with the existing advertising and data processing system, including data fraud, privacy violation, and mal advertising.

4.2.1.3. Limitation and challenges

The first limitations associated with BAT are related to the Brave Browser. Initially designed as a rewarding token accompanied with the Brave browser, BAT depends heavily on this technological shield to calculate the level of attention, precisely target suitable users for each ad, and protect the customer data (Mitselmakher, 2019; Brave Software, 2021). Hence, any failure of Brave in providing these strengths would become a considerable weakness of BAT. For example, in February 2021, a bug in the Brave browser was reported to have exposed the dark-web browsing history of their users (Lakshmanan, 2021). Although the technological issues that cause this problem have been solved, the accident still created a sense of data vulnerability attributed to Brave and BAT. This would significantly affect customers' incentives in using this BAT and Brave to protect and share their data with firms. Additionally, the fact that BAT and Brave are a duo means that they need to work together to maximize the benefits. Thus, BAT's ability to work on users, not Brave native, is still an intriguing question.

The next issue for consideration is BAT's rewards and how effective they are in encouraging the users to view the ads (Epstein, 2017; Mitselmakher, 2019). As

observed through the trend of ad-blockers, the current digital residents simply do not like ads to take their time (ibid). Thus, the incentive provided by BAT should be large enough to encourage the users to continue viewing ads and using the BAT and Brave duo.

4.2.2. Uport

4.2.2.1 Business model explain

uPort is a project focusing on identity management and self-sovereign-identity, in which customers have complete control over their data, how it is used, and who gets the right to use it (Epstein, 2017; Ertemel, 2019; uPort, 2021). Instead of three players as in the model of BAT, in uPort, there are only two parties. The first party is the internet users who keep their data in either their cryptographically secure wallets or their devices to protect and manage them. The other party, eventually, is any firms or organizations that wish to access these data.

To be more specific, uPort is a B2B service, but its model can improve B2C relationship building due to being Ethereum-native and having blockchain-encouraged prospects. By working together with firms, uPort can assist firms in building their websites or apps, in which users can remain anonymous and only provide their personal information if they wish to (Epstein, 2017; Ertemel, 2019; uPort, 2021). As firms want to access a specific part of customer data, they need to send a verified request to their users (ibid). If the user is willing to share this information, they will respond to only the questions asked in the request, and transactions would then be made on the user's mobile app of the website they used (ibid). Ertemel (2019: 41) phrases the working principles of uPort as the following:

> For instance, if a third party needs to know whether a customer is at a legitimate age to use their product, only that information, yes/no response to being legitimate inquiry is given to the third party, instead of revealing the customer's birthday.

However, it is vital to note that uPort has been rebranded into Serto. According to uPort, or Serto, this rebranding is for uPort further developments (Serto, 2021). Serto, thus, will continue to operate based on uPort mission and business model

(ibid). For this thesis, however, the name uPort would be used instead of Serto to align with the methodology and the selected articles.

4.2.2.2. Value proposition

Ultimately, the value of uPort comes from the ultimate ownership provided to users over their data and PII (Epstein, 2017; Boukis, 2019; Ertemel, 2019). Thus, not only can customers manage their data to their preference, but they can also keep track of what firms are using their data and for what purposes (ibid). Additionally, the anonymity of blockchain allows users to participate in the value co-creation process with brands without having to expose their detailed PIIs and experience any data vulnerability. According to uPort (2021), while their data protection and transactions work well with on-chain Ethereum, its true strength is exchanging personal data off-the-chain. Instead of building their product on the application layer of the internet, uPort opts for a more profound layer reconstruction to maximize blockchain features, including disintermediation, decentralization, security, anonymity, and many others (ibid). All uPort requests and transactions strictly adhere to the industry open standard of JSON Web Tokens (JWTs), with signatures validated using the proposed Decentralized Identifiers (DIDs) standard from World Wide Web Consortium (W3C) and the ERC-1056 Lightweight Ethereum Identity standard (ibid). Thus, with an app or website built with uPort, firms can give customers a more active voice and prove that firms care about customer data security, needs, and feeling with such data policy.

4.2.2.3 Limitation and challenges

The current version of uPort, however, works better with mobile apps than web browsers (uPort, 2021). Thus, this can be some point that should be considered for further improvement, as many internet users still use web browsers and mobile apps interchangeably.

Another limitation of uPort is its focus on off-chain assets instead of on-chain, which would be more challenging to measure due to the privacy-by-design nature. Finally, according to one study on the uPort mobile app, both the risk and benefits of the data management process are assigned to the users instead of firms or uPort

(Panait et al., 2020). Such data management policy raises the question of user protection, and might prevent the end user from enjoying uPort-collaborations.

5. DISCUSSION

5.1. Summary of the research results and analysis

Through the analysis of selected literature, the predominance of data intermediaries is shown to have undesirable effects on B2C relationships and customer-related activities of firms. With their excessive abilities, these data intermediaries can assist firms in many business activities, especially in the data-driven decision-making process. However, their excessive power also limits firms' vision, flexibility, and efficiency in planning, tracking, and maximizing resources, which results in emotional barriers in B2C relationships. To solve this data dilemma, firms need to achieve at least three things: reduction in the power of data intermediaries, gain more vision in customer data processing and offer customers more control in the data procedure. As a technology with remarkable immutability, security, and decentralization, blockchain can help firms reach this disintermediation scenario. Through blockchain-based solutions, firms can reduce, replace, or even remove the negative impacts of multi-data-intermediary layers. Such disintermediation would encourage more trust and transparency in the process, enhance B2C relationship building, and improve the value co-creation process.

The research also targets BAT or uPort (Serto), two companies utilizing blockchain to encourage disintermediation and B2C relationship building. Despite different and almost contradicting approaches to personal information and data privacy, both projects can provide customers with more control over their data, strengthen data security in the digital world, and positively influence B2C relationship building. BAT is designed as an optimal solution for content monetization and user privacy, in which firms will reward publishers and users for attracting and giving attention. uPort, on the other hand, phrases its focus on the concept of self-sovereign-identity, in which users will completely control their data, including what information they want to share, who can use it, and how they want their information to be used. Thus, it is

logical to say that BAT mainly focuses on user data monetization and micropayments, while uPort is more about user data control. However, if there is a comparison to be made, depending on the goals of a firm, both options can be equally effective in forging disintermediation and enhancing B2C relationships.

5.2. Arguments missing from the research results and analysis

In addition to the 8 studies included in the analysis, the author found relatively interesting articles that either tap on blockchain-based disintermediation as a general concept, in which the benefits, drawbacks, and issues for consideration are discussed. Unfortunately, as these articles do not provide a link about how blockchain-based disintermediation can affect B2C relationships, they do not have the required inclusion criteria and cannot be included in the research. However, these articles can still offer valuable discussion in that they tackle the information limited or lacked from the research, such as the general view toward blockchain disintermediation in the B2C market and the barrier for blockchain adoption.

Although disintermediation is a genuinely considerable effect of blockchain, in the current marketing and B2C relationship building and management state, complete disintermediation is relatively impossible. Instead of complete disintermediation, blockchain provides businesses with new, ground-breaking forms of intermediaries that are more sufficient, competitive, and trustworthy, just like what the WWW brought to the world. Therefore, Tan et al. (2021) claim that blockchain can partially substitute and improve certain intermediaries, but it is not designed to support the concept of complete disintermediation. Indeed, it is a chance for firms and intermediaries to reflect and evolve into better services and product providers. Zamani & Giaglis (2018) also mentioned that the most possible outcome that blockchain can bring to the digital world is either reintermediation or cybermediation. In the former scenario, the existing intermediaries will find a way to cope with blockchains and develop more competitive advantages based on this innovative technology to remain relevant in the market. In the latter scenario, blockchain will enable the previously impossible solutions to enter the market, similar to how BAT and uPort were created. B2C firms, under this situation, can outsource some of their data-related functions to the DLT providers, who offer blockchain as a Service

(BaaS) (Zamani & Giaglis, 2018). In other words, blockchain will be offered as a service, and these providers will take care of all the technological issues, leaving firms with more resources to focus on their main activities. However, it should be noted that reintermediation and cybermediation can co-exist to foster positive transformation in the industries where data intermediaries' dominance threatens firms' efficiency. Thus, existing intermediaries can conduct thorough research to optimize their value and better adjust their business model in the blockchain-enabled economy.

Whether it is through BaaS, new blockchain-based intermediaries, or the blockchain-adjusted version of the existing intermediaries, blockchain-based transformation can bring simplification, security, and many other assets to B2C relationship building. Thus, it is recommended for B2C firms to investigate this matter as soon as possible to maximize the potential benefits and minimize the possible risks. From a technical point of view, blockchain, at the moment, remains in its early stage of development. The technology, thus, is still not mature enough and still has various problems waiting to be adjusted. Apart from the consensus dilemma, blockchain users should also be aware of the regulation, interoperability, security, and volatility, which would create hesitancy towards mainstream blockchain adoption (Frizzo-Barker et al., 2020). A study by Sahebi et al. (2020) declares that the most impactful issues preventing the wide adoption of blockchain are regulatory uncertainty, lack of knowledge, lack of employee training, and high sustainability cost. Knauer & Mann (2020) also highlights the barriers of blockchain adoption from a German customer perspective, with concerns towards high energy consumption and limited knowledge on blockchain and how blockchain-based innovation can be used. Thus, besides the needed technical improvement, firms will need to acknowledge their employees and customers on blockchain.

Despite these visible limitations, blockchain-based disintermediation would still be considered as a positive investment for improvement in the processing of data and B2C relationship building. As Epstein (2017) argues, blockchain is the solution for industries where intermediaries are disrupting the situation. Thus, the sooner firms invest in understanding, improving, and planning blockchain-based changes, the more advantages as first and early movers they will collect.

5.3. Reflections on the research process

The literature review enabled the author to explore different research methodologies and select a rather sophisticated and logical research method and a doable research scope with achievable goals. Thanks to these straightforward instructions, the author was able to stay relatively focused in the research process and have a solid vision of what the thesis will look like once completed.

However, due to the chosen methodology, the whole research period relies heavily on keyword choice. The question that the author wants to answer is how blockchain-enabled disintermediation can significantly impact B2C relationship building. However, the phrase B2C relationship can sometimes be preferred as brand-consumer relationship or business-consumer relationship. Thus, the author decided to select 'blockchain', 'disintermediation', and 'relationship' as the search keywords. Although such keyword choice maximized the pool of articles related to the researching topic, it resulted in a more labor-intensive work for the author in the abstract screening phrase. There were a total of 1333 articles found with the required keywords that were available for screening. However, the majority of them were either too general or off-topic for two significant reasons. Firstly, disintermediation is a well-discussed competitive advantage of blockchain and is included in many blockchain-focused research literature. Secondly, the keyword' relationship' has a relatively general meaning in academic research. Because of problems existing in these two keywords, a significant number of articles found from the collecting data process ended up mentioning blockchain-based disintermediation but under the perspective of other sectors rather than from B2C relationship or relationship management. Most of these irrelevant articles approach blockchain and disintermediation from a perspective in finance and supply chain management. There is also a large number of articles focusing on the more fundamental and technological prospect of blockchain. These problems in the initial question keywords choice mean that the extracted information was considerably limited and hard to find despite the work-intensive screening process. However, the author believes that the problems initially come from the topic and research questions, not the keyword.

Through the research, blockchain-based ‘disintermediation’ and ‘privacy’ appeared to be closely related keywords. Blockchain-based decentralization, anonymity, and protection result in blockchain’s ability to disintermediate. Hence, disintermediation is a far more “niche” topic than words like privacy or protection. Thus, if the thesis research questions were about blockchain-based privacy and its impact on B2C relationship building, things might have been easier. However, this is just a personal thought-based hypothesis, and it might be that there would be other difficulties associated with these alternative research questions. Besides, it is how blockchain can attack the overpowered middlemen and improve B2C relationship management that interests the author.

Moreover, based on the research findings, there is still a positive view towards blockchain-based disintermediation and B2C relationship building. The review, research, and analysis of relevant literature also result in a comprehensive understanding of the focus topic, including blockchain, its technical features and properties, its attribute to the concept of disintermediation and B2C relationship building, and the challenges relevant to the current phase. Thus, the difficulties endured in the research process are worth the findings.

6. CONCLUSIONS

6.1. Main findings

By reviewing and analyzing relevant literature, this thesis has shown how blockchain can provide the needed technical layer in customer data processing, encourage disintermediation, and enhance B2C relationship building. Under the effect of digitalization and the trend of customization, customer data and the processing of such valuable resources have become vital for the B2C market, which creates the opportunity for data intermediaries to perform value-adding activities (Boukis, 2019). However, the excessive growth and dominance of these intermediaries limits the authority of customers and firms in the data management process and leads to privacy issues that can jeopardize B2C business efficiency, particularly in the realm of customer-brand relationships (Boukis, 2019; Rejeb et al., 2020).

Due to its 6 transaction steps and 3 main protocols, including cryptographic hash function, digital signature, and consensus algorithm, blockchain possesses valuable technical properties, namely integrity, immutability, security, and decentralization (Pilkington, 2016; Puthal et al., 2018; OECD, 2018). Blockchain, therefore, can disrupt the B2C market structure. Unnecessary data intermediaries would be reduced or even removed while firms and customers would gain more control in processing data (Epstein, 2017; Boukis, 2019; Mitselmakher, 2019; Rejeb et al., 2020). Such blockchain-enabled disintermediation lowers the cost, complexity, and uncertainty while also adding trust and improving B2C relationships. Customers will have more control in a data management process that is not only more secure, transparent, and functional but also allows them to own and monetize their data. Hence, they will have more confidence and positive incentives to share their personal information and contribute to the value chain. Blockchain-encouraged disintermediation, on the other hand, offers firms direct customer communication and more accurate customer data. Therefore, firms can perform more precise customer learning, targeting, and personalizing activities without risking data privacy and B2C relationships.

BAT and uPort, for example, are two notable companies that provide blockchain-based solutions to reduce the layers of data intermediaries and enhance the B2C relationship. While BAT utilizes cryptocurrency and the concept of paying-for-attention to solve the quiz of content monetization, data monetization, and user privacy, uPort focuses on the self-sovereign-identity through giving users the ultimate control over their data and digital identity. These examples also illustrate blockchain flexibility and customized by design nature.

However, it is notable that blockchain facilities are still in their infancy level. Hence, apart from the remarkable potentials, firms should also be aware of the downsides of blockchain applications, namely the consensus dilemma and knowledge barriers.

6.2. Implications for international business

As argued by Epstein (2017), blockchain is the solution for problems associated with the dominance of intermediaries. Thus, B2C firms can consider building blockchain-

enabled solutions to remove ineffective data intermediaries, enrich the value chain, and strengthen B2C relationships. However, it is notable that although blockchain can minimize the dependence of B2C firms on data intermediaries, it is not likely to remove all of the existing data intermediaries (Zamani & Giaglis 2018; Tan et al., 2021). Instead of complete disintermediation, cybermediation is a more feasible outcome in which blockchain enables innovative solutions that are not possible before. Simultaneously, existing data intermediaries can also adopt blockchain to improve their services or products and re-intermediate. Additionally, blockchain is a flexible and customizable technology. Depending on the design, different blockchain solutions can have different sets of core advantages and limitations. Thus, whether being a direct seller or a middleman, it is recommended that firms thoroughly analyze their goals before constructing blockchain-based solutions to maximize the advantages and minimize the disadvantages.

Due to the infancy nature of blockchain, firms might experience challenges during the implication process. However, blockchain is a technology with many remarkable potentials, and the early-mover advantages would be worth these difficulties.

6.3. Limitation of the research

This research relies on a set of secondary data to extract valuable findings and achieve a comprehensive view of the research topic. Thus, the author's experience and expertise are essential for both the material selecting and analyzing process. The limited experience that the author has in conducting systematic literature selection and case studies might have prevented the establishment of more specific findings and implications. The research also discussed only 2 cases, and other companies might have different approaches to the problem. However, it is inevitable that the results still clearly answer the proposed questions and can provide general, valid, and reliable arguments for firms.

6.4. Suggestions for further research

According to Risius & Spohrer (2017), most conducted blockchain research utilizes conceptual and design-oriented methodology, leaving a limited number of business-related research using quantitative methodology. This might happen due to the infancy nature of blockchain. However, quantitative methodologies involving primary data collection would still be highly suggested for future research to extract relatively more solid, specific and meaningful results.

Additionally, blockchain-based disintermediation and its effect on B2C relationships is a recently developed research topic. Thus, although this thesis has provided a relatively comprehensive overview of the domain, there are still avenues for further research, which can be seen from the two main perspectives: customer and firms.

A major effect of blockchain-based lies in its re-distribution of data power, in which customers can have more control in the processing of data. Hence, it would be helpful to gain more knowledge on factors that affect customer's willingness to participate in this value co-creation process. Some questions that might be in the interest of researchers and firms are:

1. How would the perceived benefits (e.g., financial rewards)/ risks (e.g., data vulnerability) associated with blockchain-based solutions affect customer adoption?
2. How do different designs and associating blockchain features affect users' willingness to share their data with a brand?
3. How would perceived corporate ethics affect customer's willingness to share their data with a brand?
4. What types of rewards would encourage the use of blockchain-based solutions and the sharing of customer data?

From a firm perspective, blockchain is a relatively new and challenging technology. Thus, the equation of potential cost and benefit might be helpful, which inspired these future research questions:

1. How much does a blockchain-based solution encourage the value co-creation process between firms and customers?

2. In which industry would blockchain-based data management considerably enhance B2C relationships?
3. Do blockchain-based solutions remain equally appealing to consumers across industries?

With these recommendations, the author hopes to contribute to the success of future research in topics related to blockchain and B2C relationships.

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